Economic Structural Changes and Impact Analysis of Disasters

Topic: Disaster analysis
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The impact analysis of a disaster often employs an input-output (IO) table or a social accounting matrix (SAM) of the pre-disaster period to estimate the higher-order (ripple) effect. While computable general equilibrium (CGE) models for disaster impact analysis also use a pre-disaster IO table or SAM for interindustry relationships, they adjust the interindustry and spatial relationships through the optimization process, resulting in input and/or spatial substitution changes. The previous studies found that changes in regional economic structure caused by damages from a disaster (the 1995 Kobe Earthquake) appear substantial (Okuyama, 2014, 2015, and 2019). The structural change by a disaster is not accounted for in the pre-disaster IO table or SAM, and is potentially not effectively reflected by the optimized structure in the CGE models, due to the built-in mechanisms in the economy, such as resilience, which adjust and cope with such a dire situation (Dacy and Kunreuther, 1963). This study uses the pre-disaster and post-disaster IO tables, compared with the estimated no-disaster IO table in the same year as the post-disaster table using the shift-share decomposition technique, to evaluate the differences of the economic structure, particularly interindustry relationships, among these three tables. In addition, their structural differences are examined using various IO techniques, such as linkage analysis, key sector analysis, analysis of multipliers, singular value decomposition, and so on. The results reveal the diverse effects of the disaster on the regional economy, especially among the manufacturing sectors. In this regard, the use of the pre-disaster table for the impact analysis of the event derives a misleading estimation.